Journal of
Alzheimer's Disease & Parkinsonism

Sani et al., J Alzheimers Dis Parkinsonism 2015, 5:1
DOI: 10.4172/2161-0460.1000182

Short Communication Open Access

Successful Regeneration of CNS Nerve Cells a Possible Bye Bye O Debilitating Effects Of Neurodegenerative Diseases

Manly Sani*, Boyo Blossom Hans Idris and Ibrahim BG Bako

Faculty of Medicine Department of Human Physiology, Ahmadu Beloo University Zaria Abuja, Sokoto Road, Nigeria

Keywords: Neurodegenerative disease; Treatment failures; Transgenic manipulation; Basal ganglia pathways

Introduction

Nerves cell of the central nervous systems rarely divide after differentiation, similarly their regrowth in limited unlike the peripheral nerves cells in which regeneration is possible, trauma, disease or lesion are etiological factors implicated in degeneration of nerves cells so that their basic functional roles are compromise example contraction and relaxation of muscles and hence generally locomotives ability of affected part of the body.

In past most diagnostic method were used to elaborate the mystery behind neurodegenerative disease such as parkinsonism, AMLS, Alzheimer's disease etc, subsequently some treatment modalities were developed, unfortunately they have thus far prove in ineffective in terms of long time benefits for patients, the major cause of these problems is due to the fact that the neurons which ably transmit information from muscle up to the interconnected pathways in the brain basal ganglia are impaired owing to high rate of degenerative processes as mentioned ,especially the neurons found in the CNS for they do not regenerate unlike the peripheral neurons which regenerate most times [1] show that main focus of research is an spinal code for reason attributable to structure of the CNS white matter and grey matter.

In view of these problem therefore so many alternative had been developed at least in part to ameliorate the effects of these sickness, some of which include electrical ablation, -use of drugs which act on the synaptic junctions, surgical implantation of electrode, introduction of biochemical elements which regulate neuromodulators reuptake, One of these impaired processes are implicated in the degenerative process and uncoordinated muscular movements experience by the patients, inclusive of motor unit for fine movement, facial expression and so on.

Nowadays research uses many processes to regenerate CNS neurons, however most end in colossal failure except instance where complete spinal cord regeneration was successfully done but even at that these limited to periphery, the CNS brain neurons rarely regenerates , this underscore the importance of looking at the possibility of gene manipulation so as to eschew the challenges of regeneration mentioned above, it is not contestable that much data obtained from genomic studies has further elaborated how genes work in coordinated fashion to regulate specific body processes example single point mutation as found in micro array techniques, co inheritance, and intra gene expression etc, in fact recent discovery has shown the co-linkness of gene affecting a particular physiological functions(haplotypes), again from research stand point genes can be switched 'on' and 'off', in addition transgenic manipulation had been used in research, furthermore analysis of protein interaction had been done using other technique so that available proteomic data can ensure proper synchrony of genomic data given that post translational modification determines function of proteins and again not only one genes but also protein that are involve in etiological factors of lack of regenerative ability of CNS neurons. For instance [2] showed how certain techniques are used in protein interaction studies. Consequently, I posit that possible transgenic manipulation of clearance factors will aid, perhaps the regeneration of nerves cells, these though may only target the effects of the disease and not the disease itself, nevertheless it could prove a long time effective treatment measure especially when combine with other treatment types outline below.

Economic implication of neurodegenerative disease

The economic implication of debilitating disease is enormous, myoatonia associated with these disease often incapacitate the patient socially to certain extend, the cost of management of sap so much resources which underpin the need for effective treatments modalities that will lead to cure, again in research front the cost of equipments and protocol especially in developing countries had been a snag in formulation, adoption and implementation of laudable research, another factor attributable to funds scarcity is the rare nature of the disease, so that limited fund are channeled into research by government, were it not for online fund raising efforts thus far employ by certain foundation, the limited success recorded thus far would have not been realized, again high quality advanced research techniques, most times, abound for non rare disease the consequences is lag in advancement of research frontier this also affects validity of research as there are no effective machinery or specific data analysis methods or equipment required for real life application on neurodegenerative patients. Nevertheless drug companies could capitalize on this limitation, bridge the research gabs and then come up with drug or permanent treatment modalities thereby boost annual company financial report while still increase wellness of sufferer, also according to parkinsonism group in UK many drug types abound but none very effective [3].

Challenges of regeneration

Four factors militate against regeneration of neurons, (1) lack of neurilemna, (2) formation of debris of protein tangles which clog up the endonueral tubes (3) absence of schwn cell equivalent the oligodendrocytes and 4 few clearance factors (cells) which often can't cope with clearance of high turnover of the protein debris in the endoneural tubes, [4] shows the occurrence of scar tissues on injured neurone.

But assume that the CNS nerve cells could regenerate, then another challenges which need be handle is squarely is how the transgenic manipulation will specifically target the neuronal pathways implicated

***Corresponding author:** Manly Sani, Faculty of Medicine Department of Human Physiology, Ahmadu Beloo University Zaria Abuja, Nigeria, Tel: 07067151787; E-mail: sanitime2014@gmail.com

Received August 13, 2015; **Accepted** March 13, 2015; **Published** March 19, 2015

Citation: Sani M, Hans Idris BB, Bako IBG (2015) Successful Regeneration of CNS Nerve Cells a Possible Bye Bye O Debilitating Effects Of Neurodegenerative Diseases. J Alzheimers Dis Parkinsonism 5: 182. doi: 10.4172/2161-0460.1000182

in the diseases without much damage done to overall body systems example ones due to immune response aberrations, some studies which incorporate high thorough-put analysis and micro array techniques had been done, but the current knowledge base means that research at molecular levels need be done, example manipulation of clearance factors and cell cycle phases, cellular growth and genetic components can also be manipulated so as to achieve high rate of clearance in the endo neural tube of the degenerated nerve cells with minimally established physiological imbalance, for instance part of the causes of parkinsonism is high turnover of amyloid tissue debris, but this is just part of past findings for base parkinsonism foundation research assertion till date the main cause of parkinsonism is not known [5].

Again as obtained in the blood brain barrier, few clearance cells are present in the tube, so that they are unable to cope with enormous scar tissues as mentioned , additionally, any process which speed up growth rate as well as clearance rate will increase endo neural tube space and thus facilitate axonal growth , I adduce that clearance cell growth and multiplication could perhaps speed up the clearance rate, another factor is genetic manipulation of other associated factors implicated in degeneration of CNS nerve cells , In addition I posit that such cells need be made to undergo apoptosis in accordance to the time frame at which maximum clearance is attained, this no doubt, in all sense of applicable meticulousness, will required manipulation of gene cloak of the cells involves as outline in a propose study on possible regeneration of the CNS nerve cells, which could not be implemented due to certain constrains.

Current research limitation

There are many ominous constrain which include

- How to control the replicative rate of the clearance cells.
- Deactivation of the replicative mode base on time frame to allow for growth of the neuron.
- Most findings are limited to use of animal model, research result thus far applied to human subject are limited.
- In developing countries, most research institution does not have the facilities, a fact that can be attributed to prevalence rate among populace globally.
- Another notable constrains is access to research fund and grant.
- Drug or ligand development or trans genetic methods to be adopted for effective trans cellular and intra cellular desired genetic information exchange which will facilitate performance of clearance function within a given time frame.

Area of focus for current research effort

Most research efforts on these neurodegenerative diseases are at infantile stages, there is lack of ample research data owing to the rare nature of the disease. The fact of non regenerative ability of CNS nerve cells most times dissuade research effort so that few investigations have been channeled into this direction and again few research model had been done in area bordering the regeneration CNS , thus more models need be developed, if possible new research protocol, new research methodology bio-informatics computational model need be created for effective data management and analysis, again intensive research work need be done specifically on the basal ganglia projections implicated , at present no effective treatment is clinically available for most neurodegenerative disease of the basal ganglia [6], for instance in parkinsonism nigro-striated system involving dopaminergic neurons undergo progressive degeneration could be researched on using both genomic and molecular knowledge base of the lietarture, Ganong also posit that increase in loss of dopamine and dopamine receptors and neurons which occurs with age lead to parkinsonism, other neurodegenerative disease are hungtintons characterized by loss of several neurons inter-striatal that is GABA nergic and cholinergic ones. Alzheimer's disease in which cholinergic neuronal loss encompass cerebral cortex, nucleus basalis of meynert, hippocampus, amygdale and entire neocortex, evidently involves degenerative processes, it is instructive to not that they are associated with gene mutation, for instance huntintin (CAG with repeat),alpha synuclein gene, APO E isoform etc [6].

Current treatment solutions

Past findings had proffered some temporary solution as already mentioned ,some include use of estrogen centrally acting drugs to slow the progression of Alzheimer's disease ,again in most instance the neurodegenerative processes appears to be idiopathic in that valid data are needed to support findings outcomes as found in other research example true negative or true positive outcome [7], nevertheless other treatment approach such as use L-dopa in parkinsonism, surgical approach aim at removal of lesion in globuspallidus (Pallidotomy) or implant of electrode or tissue in basal ganglia, most times these treatment modalities give temporary relief, another obvious lacuna is the inability of past findings to come up with cure for degenerative processes specifically the CNS neurons.

Again Ganong posit that the cytopathological hallmark of the degenerative processes associated with these diseases is the formation of neurofibrilar protein tangles and fibers some of which bind to the

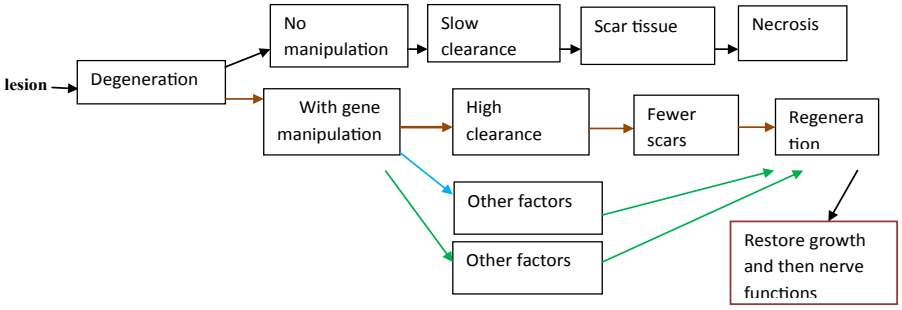

Figure 1: Simplified diagram of proposed CNS neurons degenerative remedy

Note presumably the end result of the brown arrow and the green arrow(restore growth and then nerve functions can be made to occur together taking advantage of co-expression of gene or use of principles of mobile DNA in non transgenic manipulation or transgenic manipulation of brown arrows end products

micro tubules ,research also shows that in Wallerian or retrograde degeneration, axon stump is preceded by regenerative sprout inclusive of the CNS nerve cells ,and the regenerative sprout together with it branches usually follow the endo- neural tube previously occupy by the axon, therefore presence o f these protein debris slows the processes of regeneration in CNS ultimately leading to scar formation and complete necrosis of neuron (Figure 1).

Conclusion

It obvious that current research model and strategy are limited in creation and application of treatment models, thus new ones need be developed, also integrated approach which include both genomic, proteomic and physiological studies should target four factors of degenerative processes one of which is lack ample clearance factors or cells per se. It assumed that any one of these combined with current treatment strategies could offer a long term effective treatment methods, the end result will be restoration of muscular function and productive life as well.

References

1. J. Fitz GeraldJ Bone Joint Surg Br November 2007 vol. 89-B no. 11 1413-1420
2. Yuling Y. and Gerald M (2004) Analysis of protein interactions using fluorescence technologies. Drug Discov Today 9: S27-S32.
3. Parkinsonism group UK.
4. Fawcett JW, Asher RA (1999)The glial scar and central nervous system repair. Brain Res Bull 49:377–391.
5. Parkinsonism disease foundation.
6. Ganong W.F (2011): Review of Medical Physiology New York
7. 7.Edwards AM, Kus B, Jansen R, Greenbaum D, Greenblatt J, et al. (2004) Bridging structural biology and genomics: assessing protein interaction data with known complexes. Drug Discov Today 9: S32-S40.